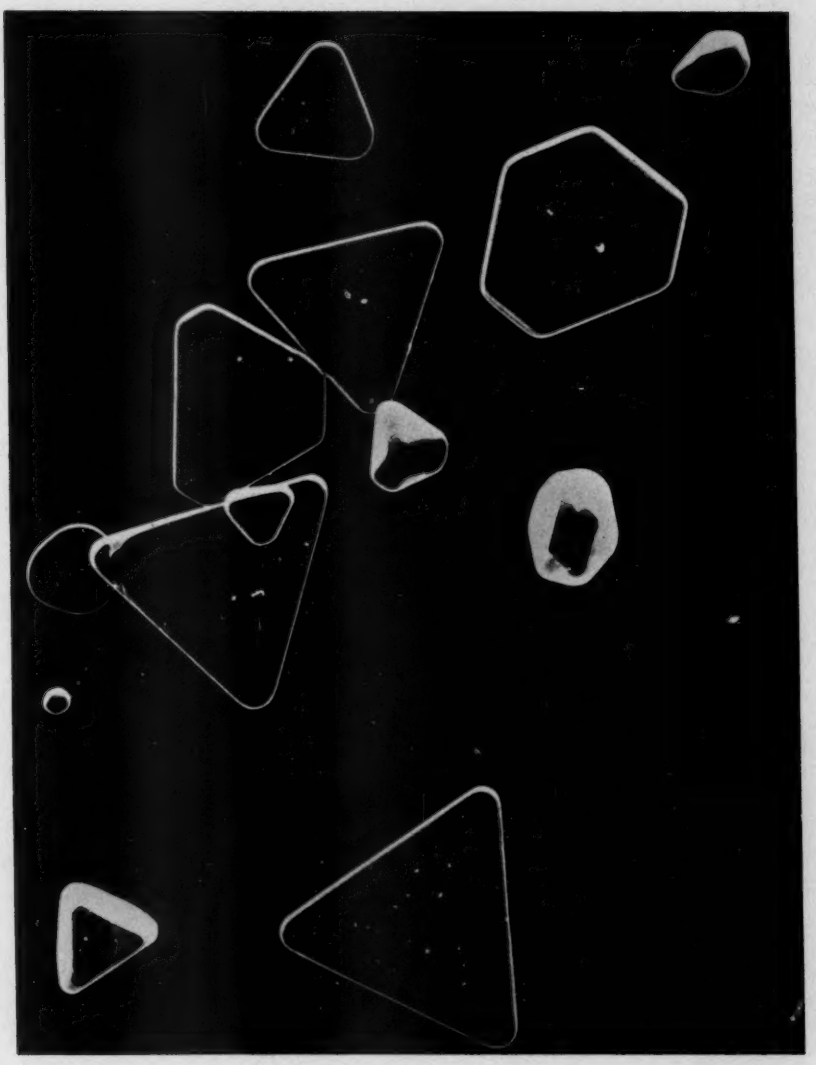

IMAGE

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THE JOURNAL OF P

IMAGE

PHOTOGRAPHY AND MOTION PICTURES

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Shadowed carbon replica from a coarse grained emulsion by Mr. J. F. Hamilton and Mr. L. E. Brady. Courtesy Kodak Research Laboratory.

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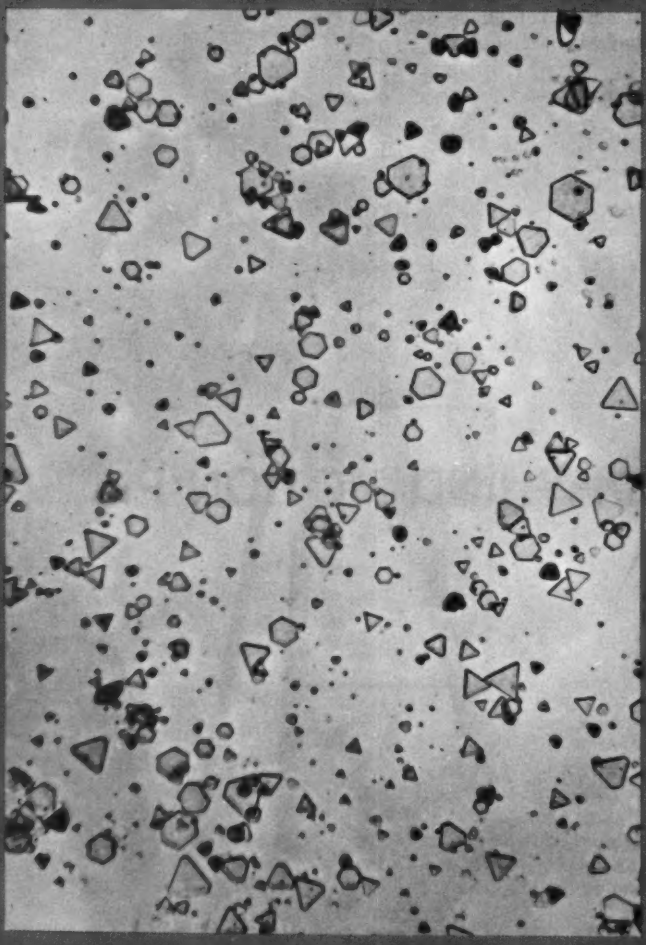

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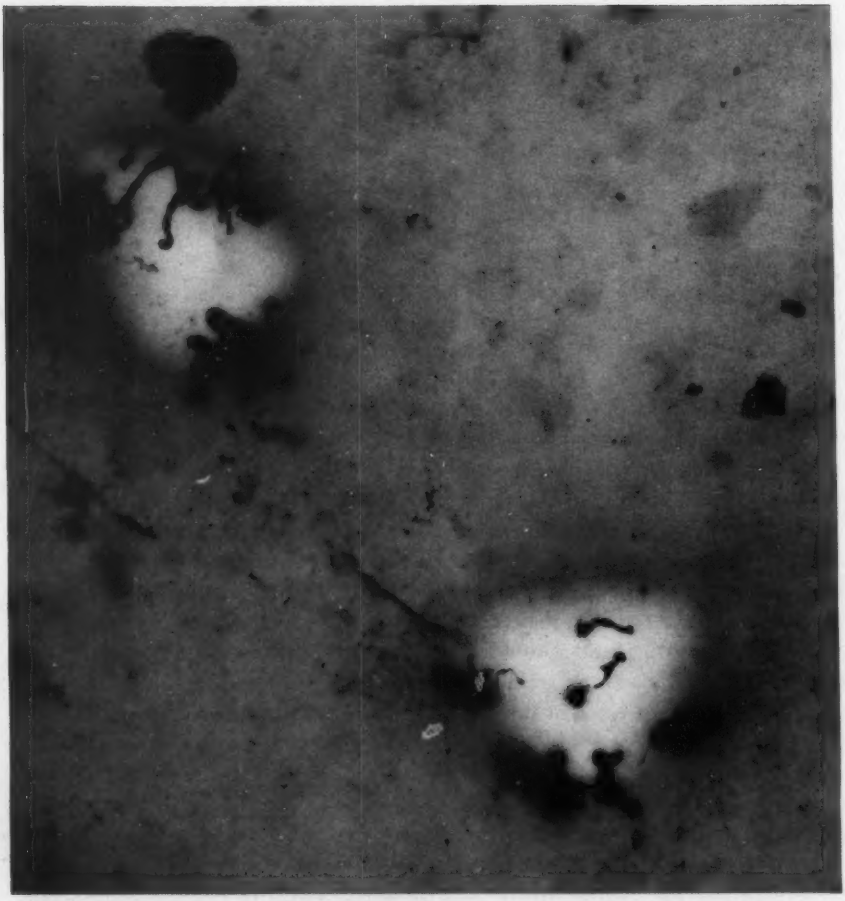
THE FORMATION OF THE PHOTOGRAPHIC LATENT IMAGE

by DR. WILLIAM WEST

THE MAKING OF A PHOTOGRAPH involves a lengthy series of operations, from the manufacture of the sensitive film, through exposure, development, fixing, and often the conversion of a negative to a positive. All of these operations are necessary, but the heart of the matter is the exposure, for it is through variations in the intensity of light falling on the film in the camera, corresponding to variations in brightness and color of the scene, that the picture is made. The history of the photographic film during the hundredth of a second or so of a normal photographic exposure may be of some interest to those concerned in any way with the uses of photography. As for most scientific problems which we attempt to explain in detail, there is no finality to the answers, and certain aspects of the mechanism of the photographic process are at present subjects of lively controversy. Nevertheless, some of the main features of our modern concepts of the photographic process are probably almost as certain as scientific hypotheses ever are, and the following sketch of these concepts and the facts on which they are based may be of some interest to those concerned in a general way with photography.

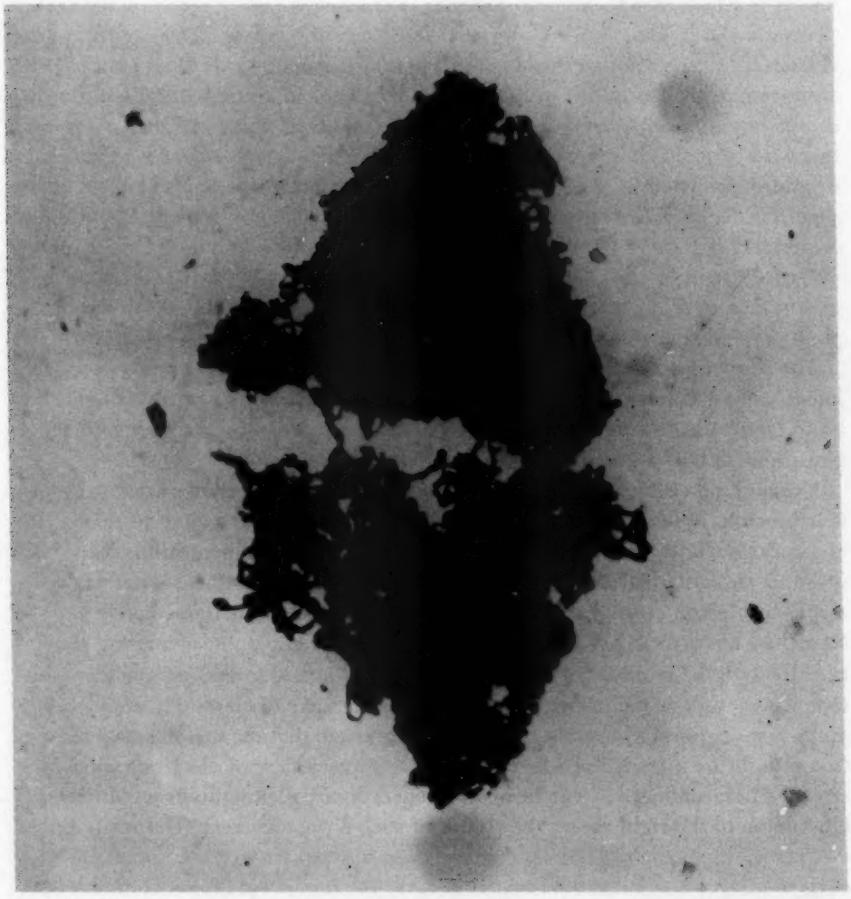
A photographic film just after an exposure shows no change whatever visible to the eye, or, for that matter, to the most powerful visual or electron microscope. Nevertheless, an important change has occurred; when the film is placed in a developer, those parts which were exposed to light are changed chemically to a deposit of dark, finely divided metallic silver, while the unexposed parts are unaltered, with the familiar result of the production of a negative image of the scene to which the film was exposed. In some way or other, the image, which we finally realize on development, was hidden or latent in the exposed but undeveloped film, and we say that the exposed film contains a latent image. The important property of the latent image is that it can greatly accelerate, or catalyze, the production of silver when the film is immersed in a developer.

We can obtain some idea of what the latent image might be by working back from the chemistry of the development process. The sensitive material in a photographic film is a salt of silver, usually silver bromide containing a little iodide, suspended as minute, but often well-formed, crystals in a layer of gelatin. The illustration to the left shows a photomicrograph of such a suspension, or emulsion, as it is



technically called, in a highly dilute form – the triangular and hexagonal bodies are the crystals of silver halide, about one thousandth of a millimeter in diameter in a highly sensitive emulsion. Such photomicrographs can be made in red light, to which the emulsion is relatively insensitive, see also cover illustration.

60 Above are shown the grains of an exposed emulsion at two stages of development, as revealed by the electron microscope. After exposure, the grains were dissolved away by hypo, leaving the metallic silver formed by development. The black filaments in the figures constitute the developed silver, which appear against the ghost of the original grain in the position which they occupied before the silver halide was dissolved. On the left, development has just started. Isolated dark clumps of



filamentary silver appear, mostly at the edges of the grains. As development proceeds, the clumps extend, until finally, as shown above, the whole grain has been converted to metallic silver. The essential chemistry of development is simple. The original grains of silver bromoiodide are composed of positively charged silver ions and negatively charged halide ions, while the developer is a reducing agent, that is, a compound which readily transfers electrons to other molecules. Electrons from molecules of developer combine with silver ions of the grain to form uncharged atoms of metallic silver, which aggregate to form the visible masses of silver constituting the photographic image. This reduction to silver occurs only in grains which contain latent image as the result of exposure, and the discrete spots at which

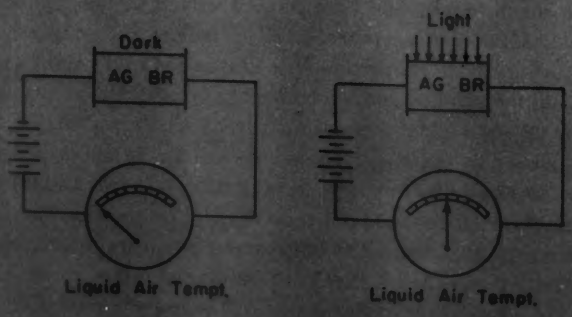
development may be seen to commence are probably the sites of latent image centers. Now it is known that minute particles of metal often catalyze or hasten the reduction of the corresponding metallic ions, or even of the ions of a different metal, and it is reasonable to suppose that the latent image center which catalyzes the development process is a minute particle of metallic silver. There are also good reasons for supposing that the latent image center contains a small number of silver atoms, more than two, but probably a minimum of three or four, although some centers seem likely to contain a score or two of silver atoms. All that is required to render a grain developable is that a single latent image center be formed by exposure. An average grain of a highly sensitive emulsion contains about a billion silver ions, and if all these are reduced to metallic silver by a single latent image center containing say 10 silver atoms, we see that about 100 million times as much silver is formed by development as is formed directly by light. It is this enormous multiplication of the effect of light by the development process that renders the photographic emulsion so extremely sensitive to light.

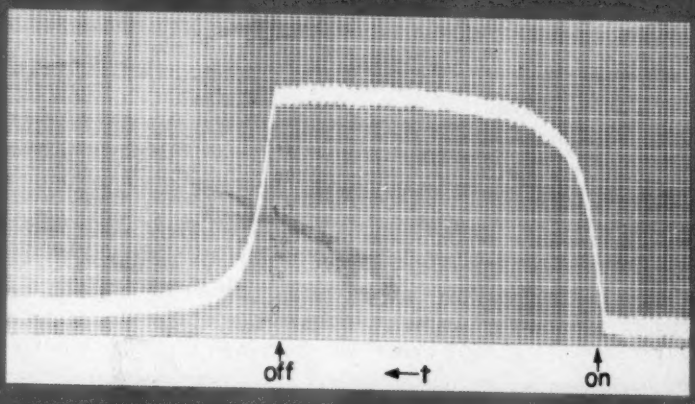
The effect of exposing a photographic film is therefore to produce one or more latent image centers in the grains of silver halide which have received light, and these latent image centers are minute particles containing a few atoms of silver. Our problem now is to find out how this happens.

Although no visible change occurs in the grains of an emulsion during exposure, it is possible by electrical means to show that something is going on during the absorption of light. If a crystal of silver bromide at low temperature is made part of an electrical circuit containing a battery and a very sensitive meter, as above, right, no electric current will be observed in the dark, but immediately light is turned on the crystal, a flow of current takes place, the current increasing proportionally with the intensity of the light. The crystal is said to become photoconductive. The nature of the currents shows that the carriers of electricity are electrons and not silver ions or bromide ions, and we conclude that the first effect of absorption of light by a crystal of silver halide is to cause a flow of electrons within the crystal. Photoconductivity can be observed in ordinary photographic emulsions; the illustration to the right shows the record of such a photocurrent. The white line is the trace of the pointer of the meter in a very sensitive d.c. amplifier, and at the right of the figure, which indicates a situation when the film is not illuminated, the position of the meter indicates that no photocurrent is flowing. Immediately the shutter is opened, a flow of current begins, rapidly attains a steady value, and begins to drop immediately when the shutter is closed. For comparison, the record of an ordinary vacuum photoelectric cell obtained by the same amplifier and meter is illustrated. Although the rise and fall of the photocurrent in the emulsion is somewhat slower than that for the photocell, the electrical response of the emulsion on illumination is on the whole quite similar to that of the photoelectric cell.

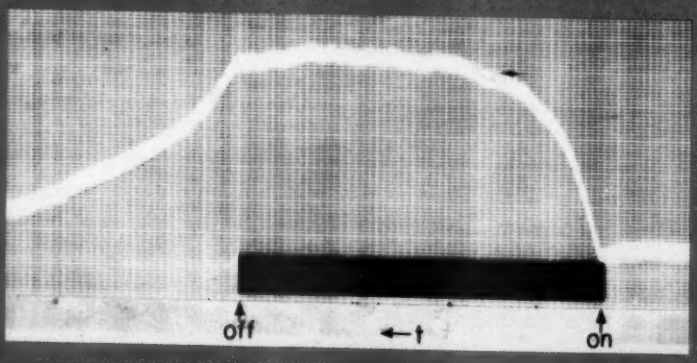
Photoelectric conductivity is not the only type of electrical conductivity shown by silver halide crystals. The silver bromide crystal is composed of silver ions and bromide ions, and a few of these charged particles can move in an electrical field, yielding an electrolytic current of exactly the same general nature as that involved in the electrolysis of salt solutions. In fact, it is possible to plate out metallic silver at the cathode in the electrolysis of solid silver bromide just as one plates silver from a silver plating solution. The electrolytic current in silver halides can be easily

PHOTO – CONDUCTIVITY





Photocell



Emulsion

distinguished from the photocurrent by the facts that it is not changed by exposure, that it rapidly decreases on lowering the temperature, and that the carriers of electricity are much less mobile than those involved in the photocurrents. It is known that only silver ions move in solid silver halides and of these, at room temperature, only a very small proportion. The illustration to the right shows how any motion of ions in the solid crystalline lattice of silver halides can occur at all. The crystal is made up of a regular array of the silver ions, shown shaded, and of larger bromide ions, shown as the larger circles. Where the lattice is perfect, the close packing of the ions prevents any from jostling their way out, and all that happens is that the ions vibrate about fixed positions of equilibrium. Occasionally, however, a silver ion acquires an abnormally large amount of energy and jumps from its regular position to a so-called interstitial position, as shown in the diagram. The vacancy in the regular lattice can now be filled by an adjacent silver ion, but the vacancy reappears at the site from which the silver ion has jumped: this is equivalent to the motion of charge and can produce a current. Similarly, the interstitial ions can displace a regular ion from its site which is equivalent to the motion of interstitial silver ions.

We have now seen two important electrical phenomena which might be concerned with the photographic process; at room temperature and at temperatures not too far below room temperature, a few silver ions move about the crystal whether in the light or in the dark, and during exposure to light, electrons move about the crystal in amounts proportional to the intensity of the light. In some way or other, it seems likely that these phenomena must be connected with the formation of the latent image.

At this stage in our investigation, it may help to consider the chemistry of the over-all reactions associated with the formation of latent image. The known chemical changes which occur as a result of exposure can be explained by supposing that a bromide ion in the lattice loses an electron on absorbing light, according to the scheme:

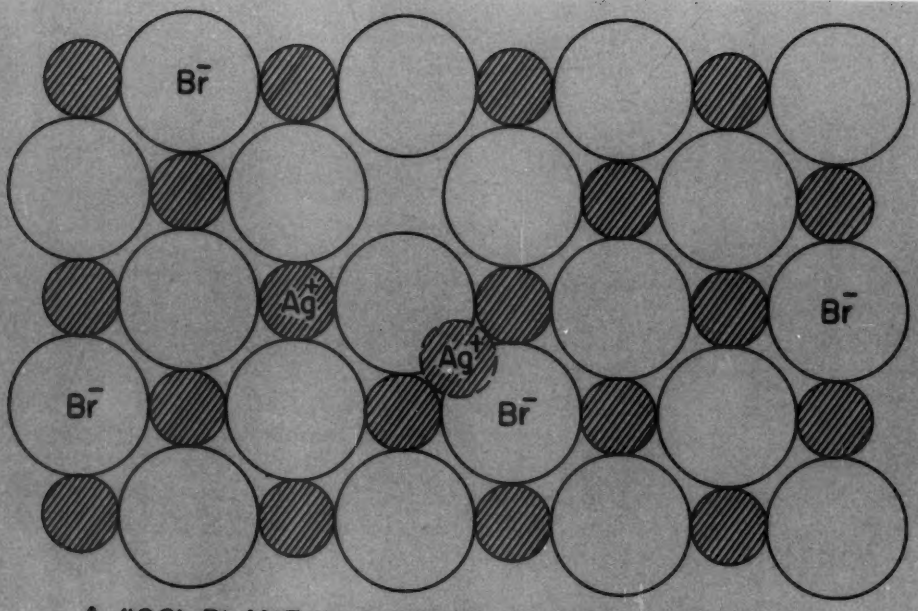
$$\mathrm{Br^-} + \text{light} = \mathrm{Br} + \text{electron},$$

and that this electron is captured by a silver ion, forming a neutral silver atom,

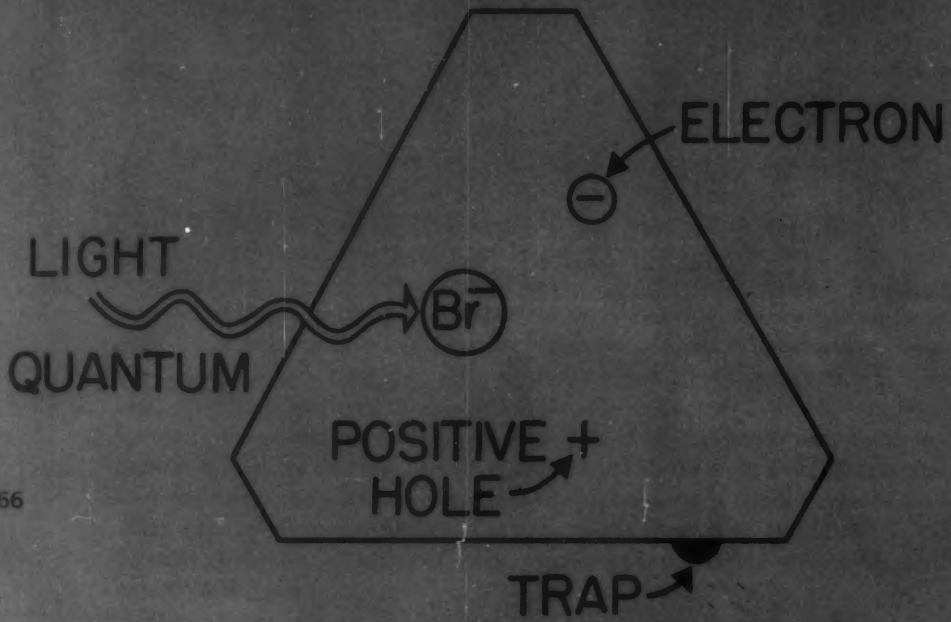
$$\mathrm{Ag^+} + \text{electron} = \mathrm{Ag}.$$

We have already argued that the latent image is composed of a few silver atoms. The bromine atoms left as a result of the loss of electrons by bromide ions could escape from the crystal as molecular bromine, and in fact, bromine is known to be evolved during prolonged exposures of silver bromide and we have indirect evidence of its occurrence in the shorter exposures involved in latent image formation. But at the same time, the existence of photoconductivity during photographic exposures shows that the bromide ion cannot lose its electron to an adjacent silver ion, since the passage of the electron over such a small distance would not produce a measurable current. The electron liberated by the light must become free to wander over considerable volumes of crystal before it is finally captured by a silver ion, and the whole operation of forming the silver atom and liberating the bromine must be a good deal more complicated than these simple chemical equations suggest.

The diagram, on page 66, illustrates what actually seems to happen. Here, a bromide ion in a grain of silver bromide has absorbed a light quantum, and an elec-



A (100) PLANE IN A SILVER BROMIDE CRYSTAL,
ILLUSTRATING FRENKEL DEFECT

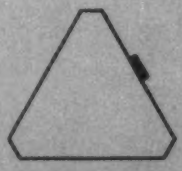

ELECTRON
LIGHT
QUANTUM
Br
POSITIVE +
HOLE
TRAP

tron has been driven out of the ion and is moving rapidly about the crystal. Now, chemically, a bromide ion which has lost an electron is a bromine atom, but this bromine atom in the crystal has special properties arising from the mere fact that it is contained in a crystal otherwise composed of positive and negative ions. Since an electron carries a negative charge, the region in the crystal which lost the electron is deficient in negative electricity, that is, it carries a positive charge. Our bromine atom in the crystal is therefore in a region of positive charge, and to emphasize this aspect of its behavior, we call it a positive hole. This region of positive charge does not stay fixed in the crystal, for the hole can be filled by an electron from an adjacent bromide ion, which, in turn, becomes the seat of the positive charge, and in this way the positive hole moves about the crystal like a positively charged electron. As the result of absorption of light, we have, therefore, running about in the crystal, a negatively charged electron and a positively charged hole, and since unlike charges attract, there is a possibility that the two will meet and recombine. If they do so, a bromide ion is regenerated, and no over-all chemical change has occurred in the crystal. Suppose, however, there is a spot in the crystal which can attract and hold one of the charges before it has met the other. If, for example, the hole is held or trapped at this spot, it can no longer overtake and combine with the electron, leaving the electron free to combine with a silver ion to form a silver atom and so initiate the formation of a latent image center.

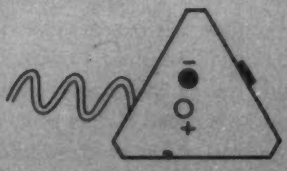
Now, it is found that the purer one makes silver halides, the less sensitive they become photographically. Photographic sensitivity belongs to the interesting group of phenomena, of great importance in the whole chemistry and physics of solids, in which behavior is profoundly modified by the merest traces of foreign material, impurity as the chemist would customarily designate them. Transistor action depends on minute traces of elements such as arsenic or boron in germanium, often to the extent of much less than one part per million; the luminescent powders of television picture tubes and in fluorescent lamps owe their properties to traces of certain foreign metal ions in a matrix of zinc sulfide or similar compound, and the photographic emulsion owes its great sensitivity to light to trace amounts of the proper foreign material.

In very pure silver bromide, it seems that the photoelectrons and positive holes simply recombine, and the absorbed light produces no chemical change. In order to achieve high photographic sensitivity, it is necessary to keep the electron and the positive hole apart, and the fundamental effect of those impurities which confer high photographic sensitivity is to act in this way. The impurities act, so to speak, as traps for the electrons and holes, immobilizing them, preventing their coming into contact and recombining.

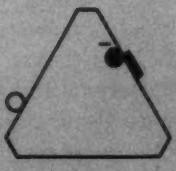
Long before the modern picture of photographic sensitivity had been evolved, practical emulsion makers had realized that not only was gelatin a convenient medium in which to suspend the emulsion grains, but that it greatly influenced the sensitivity of the film. In the late '20's, a classic series of studies by Sheppard at the Eastman Kodak Laboratories showed that gelatin owed its sensitizing effects to small amounts of sulfur compounds, which, under the conditions of emulsion making, could react with silver halide and form traces of silver sulfide at the surface of the grains. The silver sulfide in fact acts as a sensitizing impurity,



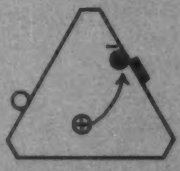
Initial crystal



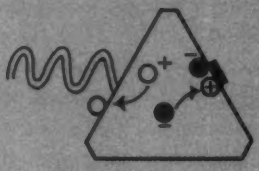
Photon absorbed



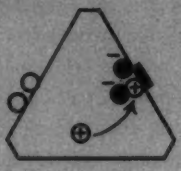
Electron trapped



Silver ion migrates to trapped electron



A second photon absorbed



A second silver ion migrates to form $(Ag)_2$

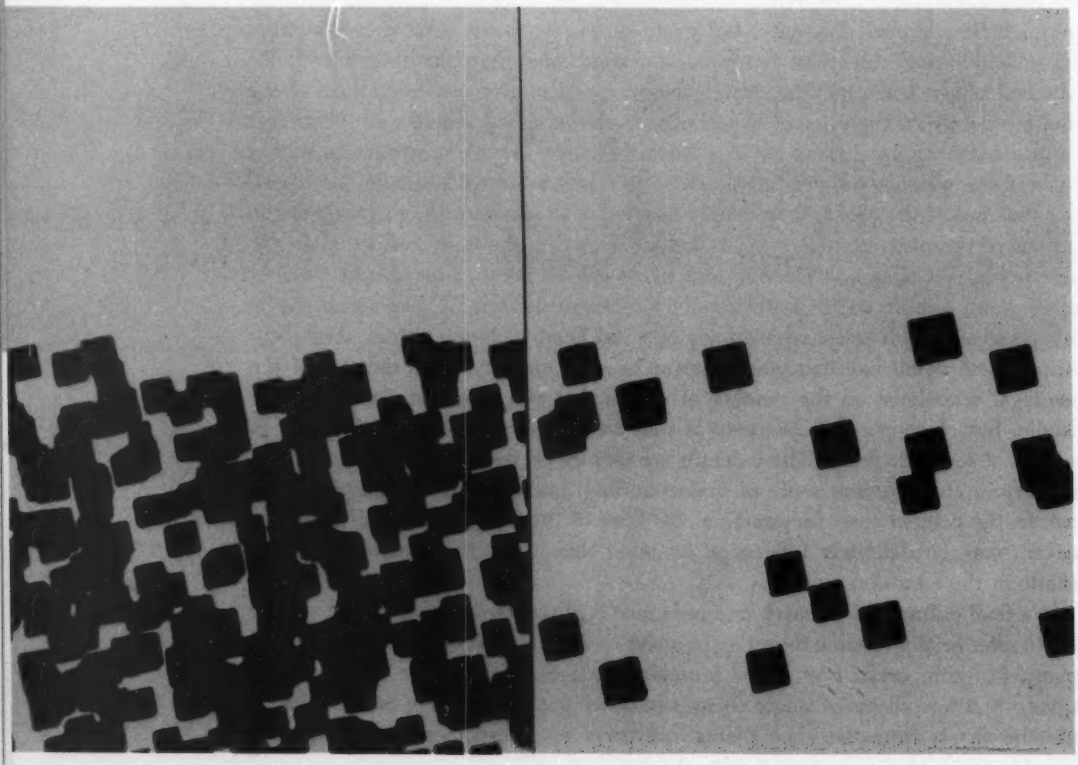
trapping either the electrons or the positive holes, and preventing recombination. Sheppard himself thought that silver sulfide trapped electrons. The first detailed account of latent image formation, by Gurney and Mott, is illustrated on the left. We have first an unexposed grain, which contains a trace of silver sulfide; then, the grain has absorbed a quantum of light, and a free electron and a positive hole have been formed. The electron roams through the grain at a speed of about 5 miles per second at room temperature, and is quickly trapped by the minute speck of silver sulfide at the surface. The positive hole also reaches the surface, where it becomes an adsorbed bromine atom. The trapped electron makes the sensitivity speck negatively charged and can attract an interstitial silver ion, which, as we saw, were mobile at room temperature. The mobile silver ion wanders up to the trapped electron and combines with it to form a silver atom. If, now, a second quantum is absorbed by the grain, a second photoelectron can be trapped by the silver atom already formed and the corresponding positive hole, after liberation at the surface as a bromine atom, can combine with the first bromine atom and leave the grain as a bromine molecule. Another silver ion wanders up to the trapped electron, combines with it, and we now have a silver center consisting of two atoms. This sub-latent image does not itself render the grain developable, but repetition of the process once or twice again will give us a stable latent image which will permit the grain to be developed even if the development process is delayed for months after the exposure.

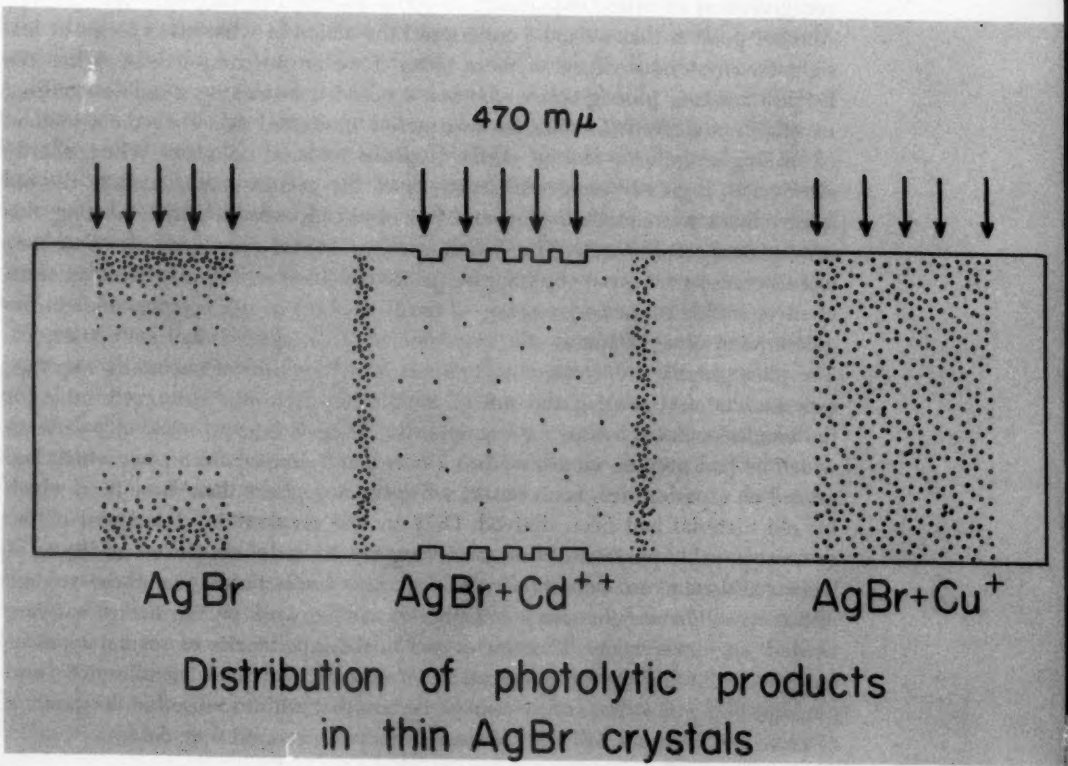
This view of the photographic process explains a number of observed facts and suggested new results, especially on effects at low temperature, which were experimentally verified. Recently, however, various workers have suggested that silver sulfide acts rather as a trap for positive holes than for electrons, J. W. Mitchell of the University of Bristol being a particularly active advocate of the revised version of the original hypothesis. In the modified scheme, an electron is captured directly by a silver ion in a specially active site of the surface to form a silver atom, which is not very stable and will surely react with bromine or a positive hole unless the hole is very deeply trapped. The silver sulfide molecule at the surface of the photographic grain is supposed to trap the hole, and if, while the hole is trapped, a second electron and silver ion combine at the site of the first silver atom, a more stable diatomic silver molecule is formed. Repetition of the process finally leads to the appearance of a stable latent image center. Argument on points of detail like this might appear to some similar to the debates of the medieval schoolmen on the number of angels that can stand on the point of a needle, but of course the difference is that we can obtain objective answers to matters of scientific detail. These details are important, not only in satisfying one's intellectual curiosity and sense of understanding, but also in technological practice. In the present case, for example, the lines of thinking of practical emulsion makers may be definitely influenced by what they think the function of silver sulfide in the emulsion may be.

As a final example of research on fundamental photographic processes, I should like to refer briefly to some recent experiments which use not normal photographic grains, but thin crystals of silver bromide made by melting the material and squeezing it into sheets of single crystals between glass plates. We can then separate the sheets from the glass plates and carry out experiments in which this

readily manipulable, relatively large single crystal acts to some degree as a model of the individual photographic grain. When such sheets are exposed to light and developed, very regularly shaped silver bodies are formed, each one of which originates in a single latent image center. The illustration directly below shows a photomicrograph of a portion of such a sheet after exposure and development. Only the lower part of the sheet was exposed; on the right for a short time, on the left for a longer time. You will see that the short exposure produces few latent image centers and few developed silver bodies, while the longer exposure produces more.

The results on the diagram to the right illustrate the great effects which can be brought about in these sheet crystals by introducing traps for positive holes. Here we are dealing not with the microscopically invisible particles of latent image, but with the visible images of print-out silver which, as is commonly known, can be formed without development in silver halide, including ordinary emulsions, by prolonged exposure. On the left is a diagramatic section of a crystal of pure silver bromide which is exposed on its upper surface to a beam of light of such a wavelength that it can penetrate the whole crystal and at the same time be absorbed





Distribution of photolytic products in thin AgBr crystals

enough to bring about photographic effects. In spite of the fact that the whole crystal is bathed in photo-active light, the print-out silver is formed only near the surface of incidence and exit of the light, with practically none in the interior. The reason for this distribution of the photo-product seems to be that in the middle of the crystal the positive holes produced during exposure cannot diffuse away quickly to the surface, and therefore combine with electrons and silver atoms, while nearer the surface, by diffusion to the exterior of the crystal, they are prevented from combining with the silver. The material on the right contains a small amount of cuprous salt in the matrix of silver bromide. The cuprous ion, which bears a single positive charge, rather readily can transfer an electron to a positive hole; the original hole becomes an innocuous bromide ion, while the former cuprous ion, after losing an electron, becomes a doubly positively charged cupric ion. The positive charge formerly on the hole is now carried by the cupric ion, but whereas the hole was mobile and could chase electrons all over the crystal and recombine with them, the cupric ion is rigidly fixed in the crystal and the chance of combining with an electron is greatly reduced. As a result of this capture of positive holes, about 10 times or more print-out silver is formed by the same absorption of light in the crystal containing the copper impurity than in a pure crystal, and moreover, the silver is formed throughout the whole thickness of the crystal.

This discussion of the scientific study of the latent image emphasizes those interesting effects of trace amounts of material in a mother matrix which are being recognized as of prime importance in many branches of chemistry and physics. Another point is that we must understand the action of what often seems at first sight the mysterious effects of these traces if we are to control them. When the English amateur photographer who first succeeded in making a usable emulsion in gelatin conceived the idea, he was merely interested in a convenient method of making a uniform coating of the sensitive material on glass. When, shortly afterwards, a greatly increased sensitivity of the gelatin emulsions over the old inconvenient wet collodion emulsions was observed, especially after heating, this was an unexpected bonus. These early workers had, of course, no idea that they were increasing sensitivity by trapping positive holes or electrons by trace amounts of silver sulfide formed by reaction of small amounts of sulfur compounds in the gelatin with silver bromide – the very concept of the electron had not yet arrived. The photographic industry got off to a fair start by means of unceasing empirical experimentation, intuition and rule of thumb, but there was constant trouble for the emulsion maker when, for example, he changed from a batch of gelatin to which he had become accustomed to a new batch derived from cows which had grazed on a pasture less luxurious in sulfur-bearing plants than those from which his old material had been derived. Only by the preparation of material of the greatest possible purity and then observing the effects of controlled additions of known addenda can we achieve the necessary understanding of these strange effects in solid-state chemistry and physics. Active work of this nature is being carried out in university laboratories and in the laboratories of several types of industry, including the communications, electronic, electrical, metallurgical, and photographic industries, and we can be certain that with increased understanding of these effects, there will emerge many new products and new devices.

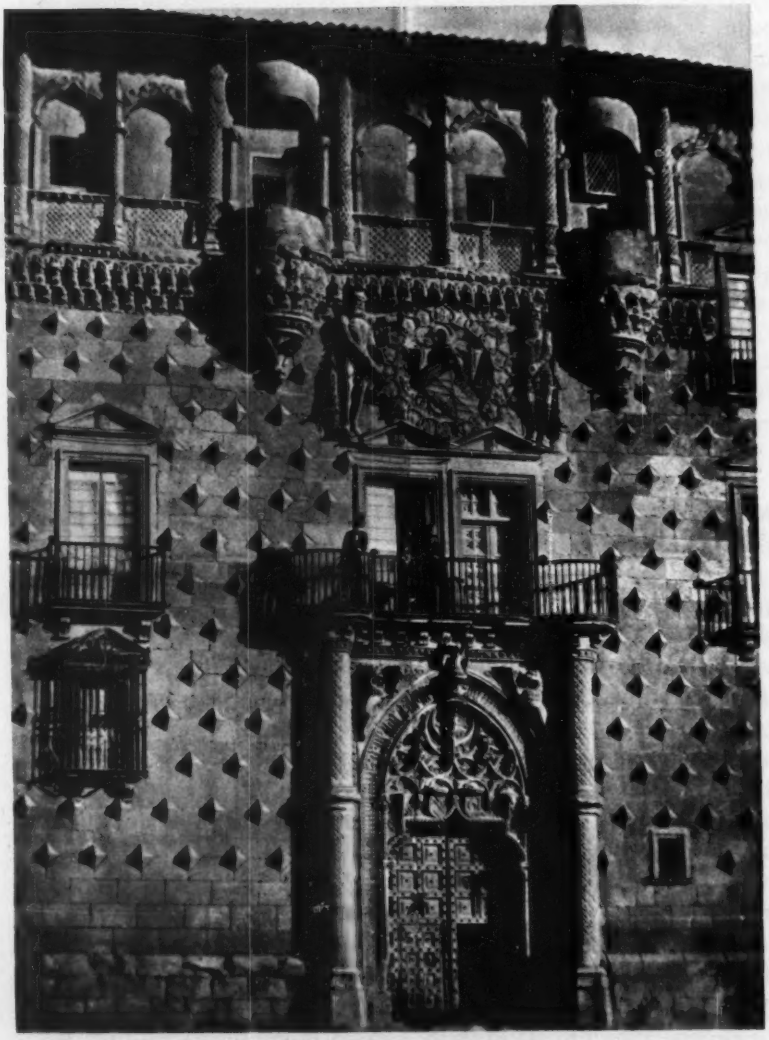
CHARLES CLIFFORD

by HELMUT GERNSHEIM

AT THE TIME OF OUR EXHIBITION "A Century of Photography from the Gernsheim Collection" in the Art Museum at Gothenburg in spring 1956, the Director, Dr. Westholm, asked me to look through several boxes of miscellaneous photographs in the Museum's possession. The most exciting were fifty-three 12" x 16" prints of Spanish subjects, which I was able to identify as the work of Charles Clifford, an Englishman who lived in Madrid and was Court photographer to Queen Isabella II. They date from the late 1850s and fall roughly into three groups: 8 landscapes; 29 architectural subjects in Toledo, Avila, Malaga, Granada, Saragossa, Seville, Madrid, Burgos, Cadiz, Segovia and Barcelona; 16 photographs of art objects in the so-called Treasure of the Dauphin, inherited by Philip V from his father the Dauphin (son of Louis XIV). I understand from Dr. Westholm that this treasure is now exhibited in the Prado Museum, but in Clifford's time it was housed in the Royal Armoury *(Armeria Real)* in a wing of the Royal Palace, Madrid.

My interest in this photographic treasure-trove was naturally great, for photographs by Clifford are rarely met with outside Spain, and with the exception of one view of Burgos Cathedral which is also in the Gernsheim Collection, all the subjects at Gothenburg were new to me. In fact, his photographs at Gothenburg form the largest collection known to me. I gladly respond to the suggestion from the George Eastman House to communicate the little I have been able to find out about the man and his work.

Though an architectural photographer of unusual merit, comparable with MacPherson, Bisson and Baldus, details of Clifford's life and career are as elusive as examples of his work. Spain, unlike Italy, was not a country much frequented by tourists in the nineteenth century. It was not on the usual itinerary of the Grand Tour, and hence few of Clifford's photographs found their way into English print collections. Since Clifford seldom sent his pictures to photographic exhibitions, although he was a member both of the Société Française de Photo-



Infantado Palace, Guadalajara, Spain. Photograph by Charles Clifford, 1855. Courtesy of the late Dr. Erich Stenger.

graphie and of the Photographic Society of London, there are few contemporary references to his work.

This expatriate Englishman took up photography, probably in the early 1850s, for his earliest pictures (not represented at Gothenburg) were taken by the Calotype process.

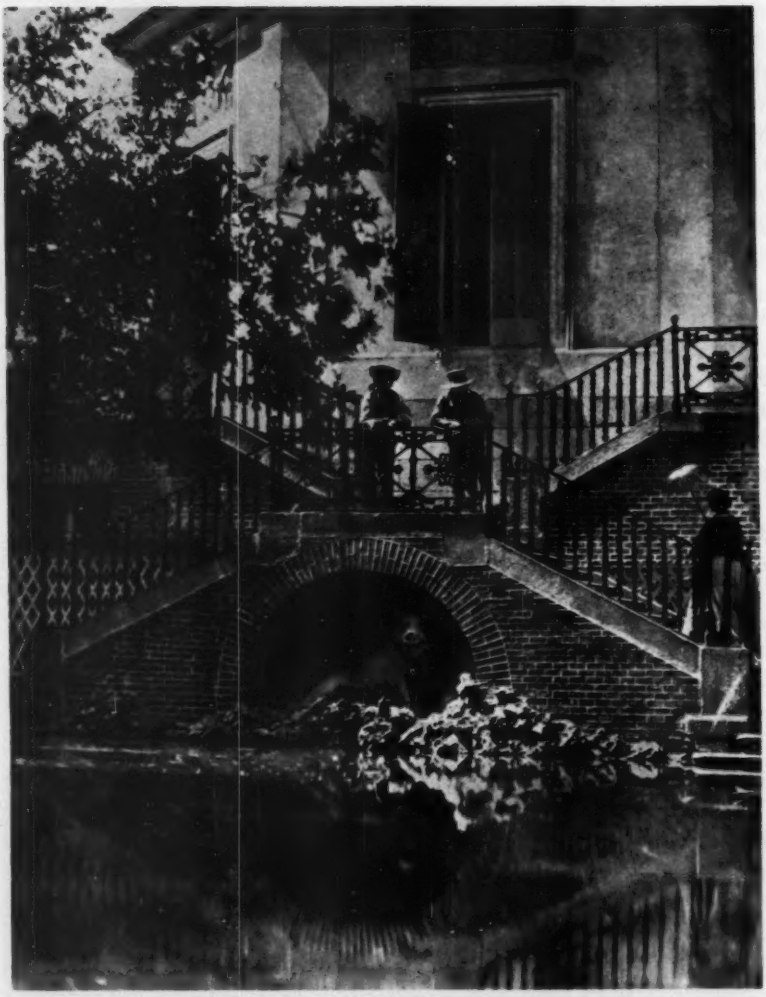
Clifford's name is first mentioned in the *Art Journal* (London) in February, 1854, in a passing reference to his photographs of Segovia shown at the first photographic exhibition of the recently-formed Photographic Society of London, which opened the previous month. Two years later Clifford published *Vistas del Capricho*, an album of 50 photographs of the Palace of the Dukes del Infantado in Guadalajara—a magnificent *plateresque* structure built in 1461 with a fine courtyard decorated with curious balustrades of twisted columns. Nearby – quite possibly even in the Palace grounds—there is the charming eighteenth-century summer residence Capricho with its pond and park, presumably so named after a caprice of the owner which led him to incorporate a statue of a wild boar under the elegant double staircase that leads from the house direct to the pond. All the photographs in this album are 10″ x 12″ albumen prints from collodion negatives bearing Clifford's signature. Many years ago Prof. Dr. Erich Stenger showed me this rare publication, to which my attention had first been drawn in 1934 by a German fashion magazine[1] in which four of the finest photographs are reproduced.

At the Photographic Salon held in spring 1859 at the Palais de l'Industrie in Paris, Clifford's series *Voyage en Espagne* called forth high praise from critics who reviewed this exhibition together with the annual Salon of painting and sculpture in the same building. One reviewer stated: "Monsieur Clifford has brought back with him from Spain more than 400 negatives on paper and on glass—one of the most beautiful and complete series of pictures which photography has yet produced. Besides the monuments which show Spain in her old glory and which are slowly deteriorating, the photographer has taken many of Nature's loveliest views, the lasting beauty of which cannot be changed by time. If you add the inhabitants and costumes of the various districts, you will have an idea of this beautiful series."[2]

It will be recalled that Charles Baudelaire used the occasion of the admission of photography to the Salon in 1859 as an opportunity to make a violent attack on it. He was, however, equally disparaging about the painting shown, and his admission to Nadar that he had written his essays in the *Revue Française* without having seen the exhibition—an admission which he qualified a few days later by claiming that he had been to it once – is not generally known, and should be sufficient warning of the "value" of Baudelaire's prejudiced statements.

Queen Isabella II of Spain thought highly of her Court photographer and presented albums of his photographs to her friends. Wishing to have a good portrait of Queen Victoria by her own photographer, she sent Clifford to England in autumn 1861 with a present of her own photographic portrait.[3] The photograph which Clifford took of Queen Victoria in the Orangery at Windsor Castle on November 14 is quite different from the motherly portraits we are used to from the many photographs taken by the English Court photographer J. E. Mayall and

1. *Die Dame*, Nr. 13, second half of June 1934.
2. ibid.



At the summer palace of Capricho near Guadalajara, Spain. Photograph by Charles Clifford, 1855. Courtesy of the late Dr. Erich Stenger.

a host of other British and foreign portraitists. Clifford made the only stately photograph of Queen Victoria, wearing evening dress and a diamond coronet. The Queen and Prince Consort were very pleased with it and gave Clifford permission to publish it in the original 10″ x 12″ size and as a carte-de-visite. Considered "the most imposing portrait which has been taken of the Queen," Queen Victoria had it copied as an oil-painting.[4] This was the last photograph taken of the Queen before her widowhood.

Early in 1863 Clifford arranged for the publication of a selection of his Spanish pictures by Marion & Co. of Paris and London. The photographs were to be issued in parts, accompanied by printed text. But while this work was in progress Clifford died in Madrid in the spring of 1863. I have never come across this publication, and indeed doubt whether it ever appeared in the form planned. However, the *Photographis Journal*[5] (London) referred to *unmounted* prints: ". . . being perfectly marvelous for their intricacy of detail, as, for example, the tracery of the door of the Hall of Justice at Granada, the Court of the Casa de Pilatos . . . and some of the details of the principal courts of the Alcazar in Seville."

At this period it was not yet taken for granted that photography records architectural detail much more accurately and quickly than a draughtsman. This is stressed in the following paragraph from the same article, in which artists are advised to concentrate on "grander efforts" (meaning no doubt historical and allegorical subjects) outside the scope of photography: "photography may be well allowed to do for us without envy what artists would not; and while art can give us pictures beyond the best efforts of the chemist and optician, her followers should be rather urged to grander efforts, than to jealousy by the near approach to her realm which modern photographers have by the most earnest efforts attained."

The *Bulletin de la Société Française de Photographie* contains two papers by Clifford. The first[6] is concerned with permanent positive printing. The fading of photographs had been causing much concern at that time to photographers and public alike, for as long as the permanence of photographic prints was in doubt, people were afraid of collecting "vanishing scenes" and "fleeting images," and returned to the less truthful but more durable engravings.

The second paper[7] describes a process of preserving the collodion plate in a moist state, which would allow the travelling photographer to prepare his plates in advance and avoid carrying the whole paraphernalia of chemicals, tent, &c. about with him. Like the fading of photographs, this matter also occupied the attention of photographers for several years in the mid-fifties, and hardly a week passed in which some new substance was not proclaimed which would extend the keeping qualities of the collodion-coated plate better than any previously used. Clifford's own brand of preservative process was one using beer.

3. *The Photographic News*, April 17, 1863, p. 183.
4. The painting is illustrated on p. 70 of *Henry Ponsonby: Queen Victoria's Private Secretary* by Lord Ponsonby of Shulbrede, London 1943.
5. The Photographic Journal, September 15, 1863, p. 361.
6. *Bull. de la Soc. Fr. de Phot.*, 1856, p. 358.
7. *op. cit.* 1857, p. 207.

ARCANA FROM EAST AND WEST

RECENT ADDITIONS TO THE MOTION PICTURE STUDY COLLECTION

OVERSHADOWING EVERY OTHER MOTION PICTURE which has been preserved by Eastman House, in its importance to the history of American films and in the unexpected excitement of its discovery, is Ince's legendary 1914 spectacle THE WRATH OF THE GODS.

Until now, existing records of this great film were both provocative and discouraging. They included partly charred papers of the N. Y. Motion Picture Company which, along with the director's original shooting script (see IMAGE May, 1956, pg. 111), somehow managed to survive fire. These fragile memos and shipping tickets tell us that Ince's Production #162 was started January 27, 1914, finished February 13, 1914,

the completed print shipped via Wells Fargo to New York on May 2, and first released as a "special," June 22, 1914.

Having the script itself with its pencilled notations (the cast is scribbled in: "Miss Aoki, Mr. Borzage, Mr. Hayakawa," etc.) is a film curator's dream of delight. But hopes of ever finding the film were considerably lessened by another office memo headed shockingly: "Negatives Which Have Been Junked October 16, 1924." And at the head of this dismal list is the title: *The Wrath of the Gods.*

Years of hunting which did at least incredibly turn up an excellent print of *Typhoon* (another memorable Ince drama with Hayakawa), failed to provide any trace of *The Wrath of the Gods.*

As long as this film remained lost, it created a serious gap in any attempt to reconstruct the major formative patterns of American film history. The Ince spectacle was completed before the release of D. W. Griffith's first grand-scale production, "Judith of Bethulia." It created an immediate sensation at its premiere in the Strand Theatre of New York June 7th, 1914. Two weeks later, Marcus Loew presented *The Wrath of the Gods* to open Ebbets Field in Brooklyn. The field was filled to its capacity of 20,000 with 40,000 rioting to get in.

Of the premiere, a contemporary reviewer wrote: "I never saw an audience more plainly moved than the thousands that sat in the Strand watching the kaleidoscope of elemental rage. The scene where the earth yawned and engulfed men and women and houses in one huge grave was overpowering. I must award no less praise to all the outdoor work and scenery in this feature. The spell of the rocks and the surf is on the screen. He who selected these seascapes had the eye and taste of a seascape painter."

After D. W. Griffith, Thomas Harper Ince was the most vital force in the early days of the rapidly developing film world. It is possible that too much is known about the work of Griffith. The Ince-produced films have been brought to light only rarely. Along with the films of W. S. Hart (which Ince produced) and such super-films as *The Wrath*

WRATH OF THE GODS 1914

of the Gods and *Typhoon*, it is important to be able to savor the skill and vigor that Ince brought to his regular program releases. Among them, we are fortunate in being able to add:

WITH LEE IN VIRGINIA 1913. Ince Kay Bee Production. Directed by William Baumann.

LOVE OR JUSTICE 1917. Ince Triangle. Directed by Walter Edwards. With Louise Glaum, Jack Richardson.

THE TEN OF DIAMONDS 1917. Ince Triangle. With Dorothy Dalton, Jack Livingston.

THE LAST OF THE INGRAMS 1917. Ince-Triangle. Directed by Walter Edwards. With William Desmond, Margery Wilson.

BACK OF THE MAN 1917. Ince Triangle. Directed by Reginald Barker. With Dorothy Dalton, Charles Ray.

FALSE FACES 1918. Paramount-Ince. With Henry B. Walthall, Lon Chaney.

THE LAST OF THE INGRAMS 1917

Another splendid American production of 1914, acquired as an original release print in excellent condition, is Universal's DAMON AND PYTHIAS. Otis Turner directed this film as a most ambitiously conceived spectacle, part of a cycle along with Griffith's *Judith of Bethulia*, of American film-pageants designed to compete with the extravagant Italian historical costume dramas that started to engulf world screens from 1911 until Griffith outclassed them all with his *Intolerance* of 1916. *Damon and Pythias*, with Frank Lloyd, Anna Little, Cleo Madison and Herbert Rawlinson in the cast, is distinguished by exceptionally fine cinematography as was Turner's *Robinson Crusoe* of the year before. It is noteworthy that three veteran directors appeared as actors in these films marking early stages in their careers. Frank Borzage and Frank Lloyd were leading players in *The Wrath of the Gods* and *Damon and Pythias* respectively; the title role of Turner's *Robinson Crusoe* was acted by Robert Leonard. The dramatic high-point in *Damon and Pythias* is the sacking of a town and a raging fire. Frank Lloyd in a recent letter disclosed that nitrate film was used to furnish a realistic fire. The flames soon blazed out of control and real

FALSE FACES 1918

AELITA 1924

panic directed the extras in a mob scene of complete conviction. A film historian naturally must wonder with sorrowful curiosity about what pre-1914 films were burned to make the scene so real.

Film students have long been intrigued by the apparently futurist stills from the Soviet AELITA, 1924 story of a rocket trip to Mars and by published photographs from Dovjenko's Ukranian fantasy, ZVENIGORA. The films themselves turn out to be far more fascinating than one dared to hope. Protosanov's *Aelita* shows many influences of the popular Fritz Lang fantasies and melodramas of the period with an impressive corps de ballet added to the Martian episodes. *Zvenigora* appeared in 1927, and the few Western writers who saw it, at the time, more concerned with the traditional Russian film of almost standardized revolutionary plots, had little understanding for, or patience with, such a cinematic rarity as a quite successful screen fantasy.

Abram Room's powerful, near-masterpiece THE GHOSTS THAT NEVER RETURN 1929 and Kontzinzev's THE NEW BABYLON 1929 complete the group of four outstanding Russian silent films that will help fill in the all-too sketchy picture we have had of Soviet Cinema in spite of the vast amount that has been written in English on the subject.

SHIRAZ 1926 is an interesting relic of the days before film production in India had really gotten under its prolific way. Directed by Ferdinand Otten and produced by German interests, the film starred Seeta Devi and Himansu Rai in a story of the building of the Taj Mahal.

WHITHER GERMANY? 1934 is a British documentary concerned with the rise to power of Adolf Hitler. Curiously, the film was reviewed by Forsyth Hardy in 1934 with the remark that "its purpose is to awaken consciousness of the direction . . . events are taking and, though the commentary is restrained, it is plain that the film has been made with conviction that Nazi Germany is moving towards war." Seen today, it is difficult not to assess the film as an extremely equivocal use of actual footage with real doubt as to just where the maker's sympathies were placed. It deserves the closest consider-

THE NEW BABYLON 1929

ation in any study of propaganda techniques in film making.

HENRY V 1944

Other British productions newly added are:

GREAT EXPECTATIONS 1946 the first undisputed masterpiece from David Lean and probably the best Dickens transcription to date.

HENRY V 1944. Sir Laurence Olivier's noble, skillful and nearly inspiring production of the best Shakespearean cinema until now.

Film records of the great players who brought to the cinema distinction, rare artistry and the beginnings of its own tradition are amplified by these finds:

GARBO'S FIRST THREE FILMS:

MR. AND MRS. STOCKHOLM 1920 is the advertising film for the Bergstroem department store in which the then salesgirl, Greta Lovisa Gustavsson, is seen modelling overcoats and bulky winter ensembles.

CONSUMERS' COOPERATIVE 1921

CONSUMERS' COOPERATIVE IN STOCKHOLM 1921 is another advertising film, this one showing Garbo on the roof-garden of the Strand Hotel, enjoying pastry while her future leading man, Lars Hanson, sits, unaware of the cameraman, at another table.

LUFFAR PETTER 1922. Excerpts from Garbo's first full-length movie, a comedy, show her to be the complete beauty and superbly photogenic star a full year before her "discovery" by Stiller for *Gosta Berling*.

With the addition of six more films of the screen's first tragedienne, Asta Nielsen, Eastman House now has the largest collection of this memorable artist's work known to exist anywhere in the world. The new Nielsens are:

PETER THE TRAMP 1922

THE ABYSS (AFGRUNDEN) 1910. The Danish star's first film. With Hjalmar Davidsen.

BIRD OF PASSAGE 1911 (Fremder Vogel).

LITTLE ANGEL 1913. Nielsen demonstrates the enormous range of her talent in this comedy of an adolescent girl.

WHITE ROSES 1914.

ACCORDING TO THE LAW 1919. Directed by Willy Grunwald. With Asta Nielsen, Theodore Loos, Bernhard Goetzke. This film

THE ABYSS 1910

is a modernization of *Crime and Punishment* with Raskolnikov become a lady reporter.

LOU LOU 1923 (from Wedekind's *Erdgeist)* Directed by Leopold Jessner. With Asta Nielsen, Albert Bassermann, Rudolf Forster, Heinrich George. Scenario by Karl Mayer. Jessner, the great pioneer of the expressionist theatre in Germany imposed a style on this film that brings it close to the neighborhood of *Caligari.*

Another example of a typical Valentino film is always welcome; it is good to know that A SOCIETY SENSATION 1918 has survived to preserve a good Valentino performance with the support of Carmel Myers.

A WOMAN DISPUTED 1928, directed by Henry King was a Norma Talmadge vehicle adapted (very loosely of course) from Maupassant's *Boule de Suif.*

LOU LOU 1923

MANTRAP 1926, directed by Victor Fleming stars Clara Bow in a personal triumph that preceded "It." She is supported by Ernest Torrence, Percy Marmont and Eugene Pallette. The film was adapted from the novel by Sinclair Lewis, a fact that in no way restricted the extraordinary personality of Miss Bow.

THE INCORRIGIBLE DUKANE 1915 is not only the earliest film of John Barrymore known to survive; it is as well a rare example of Mr. Barrymore at his most untrammeled as a farceur.

The two most "American" of all the great American stars were, of course, Doug Fairbanks and William S. Hart. Happily the collection has been enriched with further samples of their special contributions.

ON THE NIGHT STAGE 1914. Wm. S. Hart, Rhea Mitchell.

THE MAN FROM NOWHERE 1915. With Wm. S. Hart, Margaret Thompson.

BETWEEN MEN 1915. With Wm. S. Hart, House Peters, Enid Markey.

THE HABIT OF HAPPINESS 1916. Directed by Allan Dwan. With Douglas Fairbanks, Margery Wilson.

HIS MAJESTY THE AMERICAN 1919. Douglas Fairbanks, Marjorie Daw. This Fairbanks film was the first release of the newly formed United Artists – the artists so united being Fairbanks, Chaplin, Mary Pickford and D. W. Griffith.

HIS MAJESTY THE AMERICAN 1919

THE LOVE THAT LIVES 1917

A MODERN MUSKETEER 1918. Directed by Allan Dwan. With Douglas Fairbanks, Zasu Pitts, Marjorie Daw.

Film history would be far less colorful without its debt to Theda Bara. A series of disastrous accidents and fires have apparently removed all copies and negatives of the "vamp" films of Theda Bara save for her first, *A Fool There Was* which is circulated by the Museum of Modern Art Film Library, and now Eastman House has acquired her last picture:

THE UNCHASTENED WOMAN 1925. Directed by James Young. With Theda Bara, Eileen Percy, Wyndham Standing.

Less flamboyant than Miss Bara but no less admired by her countless followers was Pauline Frederick, one of the first of the American film actresses to bring a restrained and believable style of acting to her many mature characterizations and often quite tragic roles.

THE LOVE THAT LIVES 1917. Directed by Robert Vignola with Pauline Frederick, Pat O'Malley.

THE GOWN OF DESTINY 1917. Triangle. Directed by Lynn Reynolds. With Alma Reubens.

Wallace Reid enjoyed preeminent status as the first real matinee idol of the screen, to be challenged only by the rise of Rudolf Valentino. Two more cinematic demonstrations of his memorable charm are:

THE TATTOOED ARM 1913. Directed by Wallace Reid. With Wallace Reid, Vivian Rich, Eugene Pallette.

THE AFFAIRS OF ANATOL 1921. Directed by Cecil B. DeMille. With Wallace Reid, Gloria Swanson, Bebe Daniels.

Important early European productions include:

AN EVANGELIST'S LIFE. Produced in Denmark by Nordisk, 1914. Directed by Holger-Madsen. With Valdemar Psilander, Alma Hinding, Else Froelich.

THE GALLANT MONARCH (AUGUST DER STARKE) Produced in Germany by Messter, 1920. With Ria Jende.

VENDETTA. Produced by Eclipse, 1913. From the novel by Marie Corelli.

AFFAIRS OF ANATOL 1921

A few examples of contemporary production include:

SHOESHINE 1945. Directed by Vittorio de Sica.

BREAD LOVE AND DREAMS 1954. Directed by Comencini and De Sica with Gina Lollobrigida, Vittorio de Sica.

HIGH NOON 1952. Directed by Fred Zinnemann. With Gary Cooper, Katy Jurado, Grace Kelly, Lon Chaney.

CYRANO DE BERGERAC 1950. Directed by Michael Gordon. With Jose Ferrer, Mala Powers, Morris Carnovsky, and three outstanding shorts of recent years:

GLAS by Bert Haanstra.

POVERTY CHASTITY AND OBEDIENCE by the BBC.

MOONBIRD by John Hubley.

The diversity of these additions to the study collection, with films coming from Great Britain, India, Germany, Holland, France, Russia, Denmark and Italy, attests to our continuing effort to build a genuinely representative archive so that students may base their work in motion pictures on the broadest possible background of the cinema's primary source material – the examination of the complete films themselves.

JAMES CARD

SHOESHINE 1945

CYRANO DE BERGERAC 1950

ROCKET PHOTOGRAPHY

BEFORE AERIAL PHOTOGRAPHS WERE TAKEN from airplanes, two attempts – one of which was successful – were made to carry a camera into the air by rockets.

The first experiment was by a Frenchman, Amédée Denise, in 1888. When the editor of the English magazine *Photographic News* read a preliminary account of it he noted that "the idea seems very pretty, but savours slightly of Munchausen . . ." Four weeks later, however, he gave a lengthy description, and published a drawing of the camera. The editor of the *Scientific American* described the device in December, 1888: "In its experimental form, the cylindrical camera has twelve lenses round its circumference with a sensitive plate at its center, and is provided with a shutter which opens and instantly closes as the apparatus commences to fall. The descent is eased by the opening of the attached parachute, which is drawn back to the operator by a cord attached before firing the rocket. For securing bird's-eye views, the photo-rocket offers several important advantages over balloon photography, such as comparative cheapness in operating and freedom from risk in case of use for military reconnoitering."

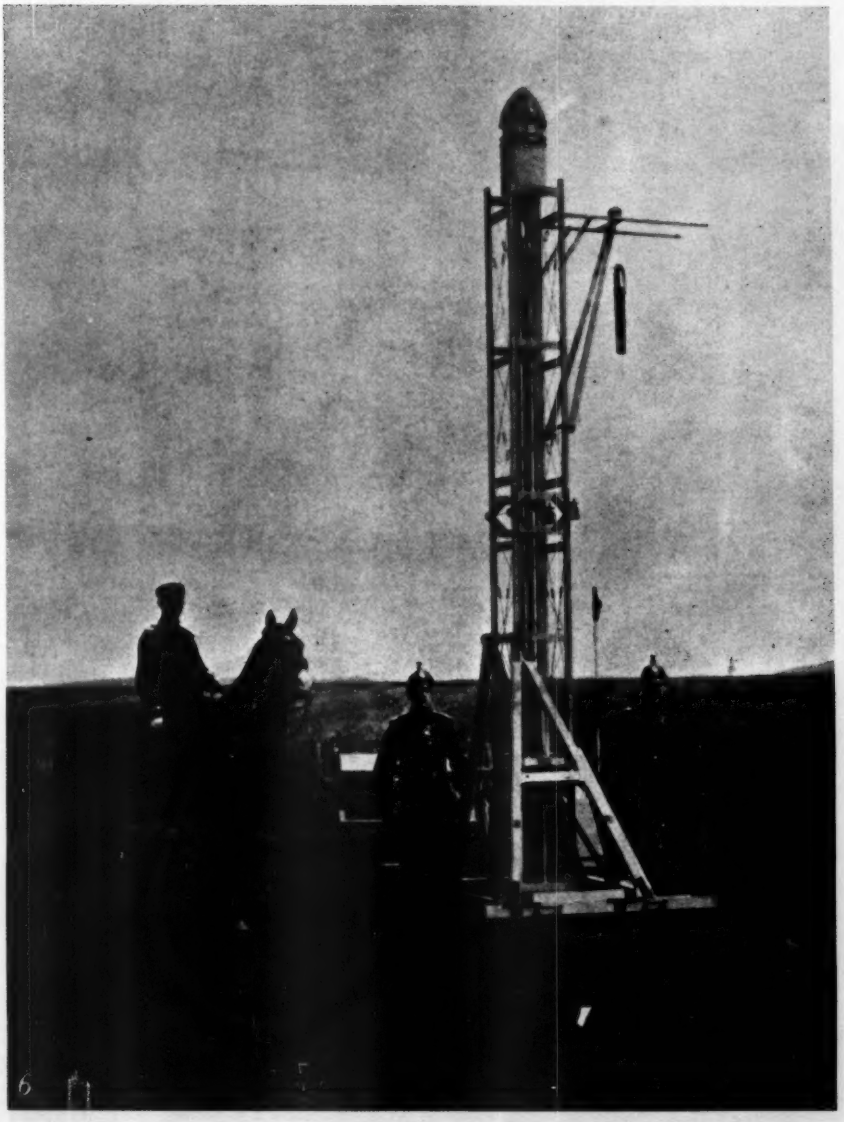
We have not been able to find any record of the successful use of Denise's invention, nor have we located any pictures taken with "photo-rocket."

But in the December 7, 1912, issue of *The Illustrated London News* there is a spread of three pictures taken from a rocket invented by Alfred Maul, plus five photographs of the setting up of the rocket on its launching pad, the blast off, and the recovery of the nose cone.

Maul took out two German patents for his photo-rocket: 162,433 (June 5, 1903), and 175,259 (Mar. 30, 1905): Josef Maria Eder, the Austrian photographic scientist and historian wrote about them in his *Jahrbuch* for the years 1906 and 1907. The missile weighed 55 pounds, and was 19 feet 9 inches long. The nose cone which contained the camera was 14 inches in diameter. After the exposure, which was timed to take place eight seconds after firing, the nose cone fell to the earth attached to a parachute. An altitude of some 2,600 feet was reached.

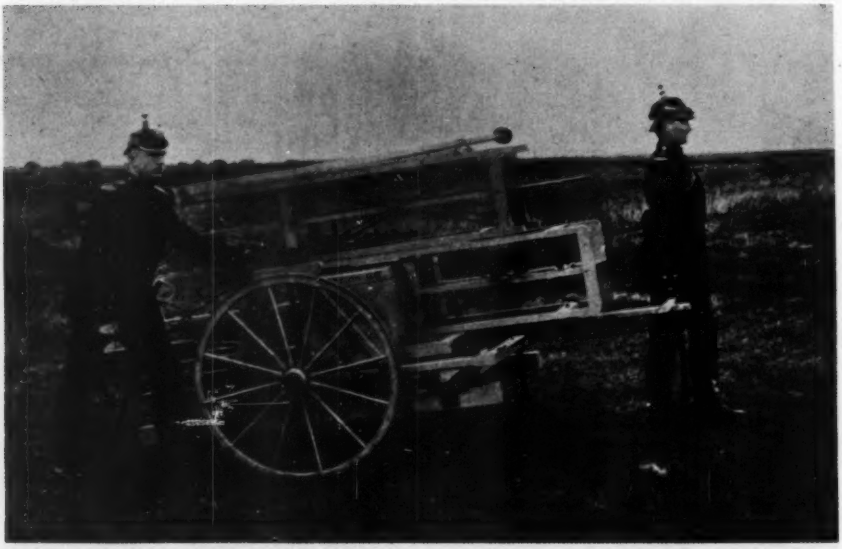
The photographs reproduced by *The Illustrated London News* are remarkably detailed: they make us hope that the originals may one day be located. A collection of Maul's rocket photographs were shown at the Photographic Exhibition in Dresden in 1909. Eder wrote, in his 1910 *Jahrbuch:* "We wish, from the bottom of our heart, that the elegant idea of Maul's, which cost him such pains and work, could be followed through and better known."

BEAUMONT NEWHALL

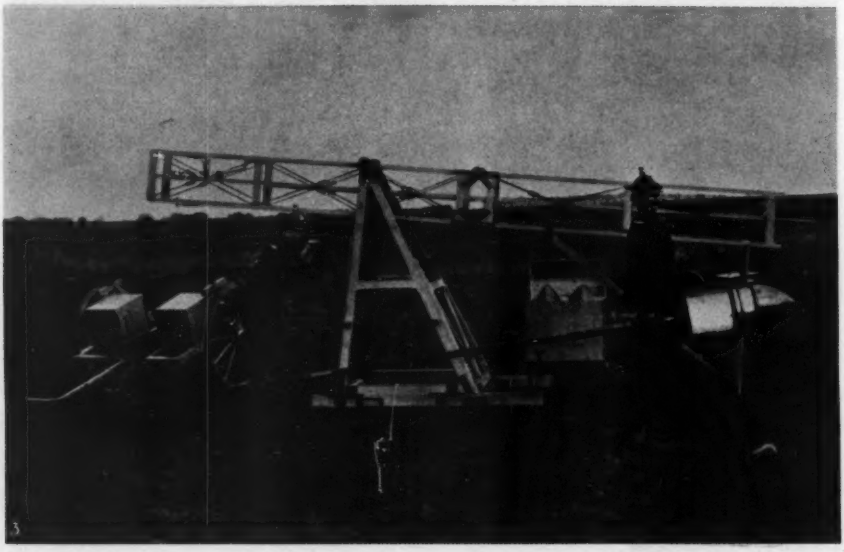


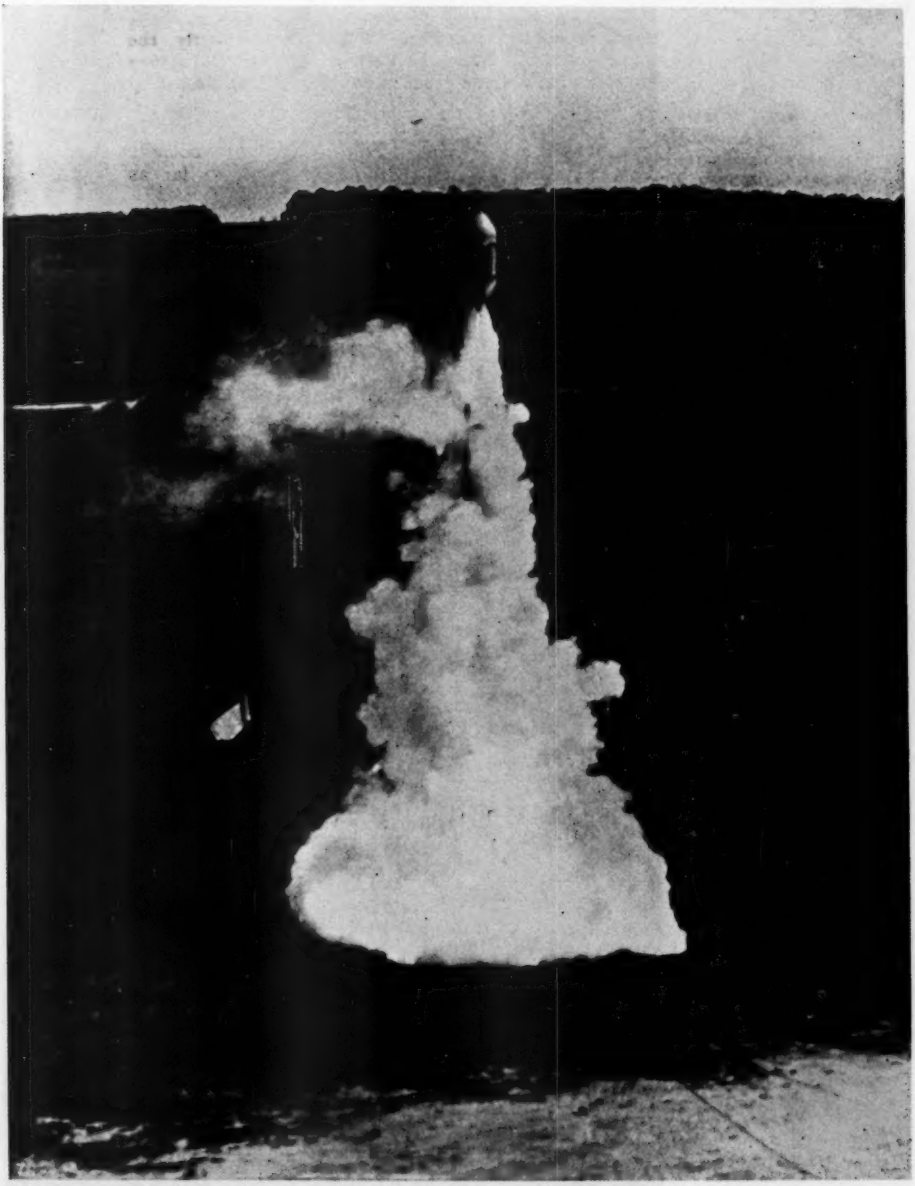
Ready for firing: The camera-bearing rocket in its framework.

The rocket which takes bird's-eye view photographs for military purposes, in the field: The device transported on its carriage.



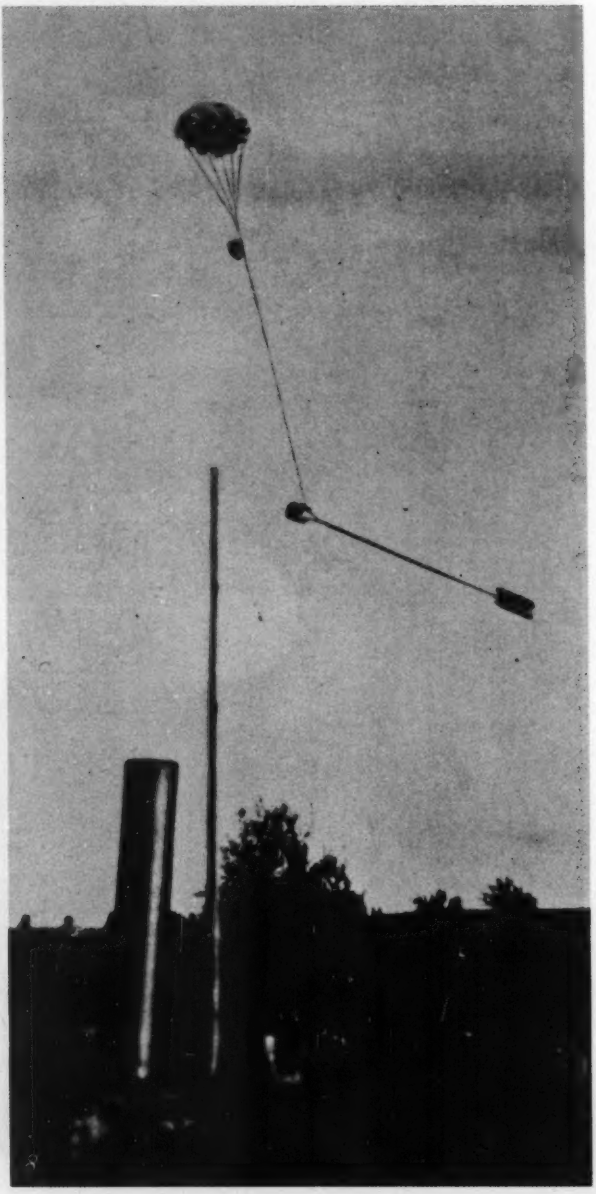
Showing the camera-bearing rocket-head, the stick with wooden "feathers," and the framework for firing: A snap-shot of an officer determining direction for the firing of a rocket-camera.





Carrying its camera aloft: The photographic rocket at the moment of its firing.

After the camera-rocket has attained its greatest height and the photograph has been taken: the head containing the camera, and the rocket-stick, parachuting to earth.



Photographed by the rocket-borne camera, which is kept pointing in the right direction by a gyroscope: The village of Laussnitz.

BOOK REVIEWS

EYE, FILM, AND CAMERA IN COLOR PHOTOGRAPHY, by Ralph M. Evans, John Wiley and Sons, Inc., New York, 1959.

THE OBJECTIVES OF THIS BOOK can best be presented by quoting the author himself:

"This book is the outcome of many years of thinking and working in the field of color photography and more especially in that phase of the subject which relates to vision. No one can spend thirty years in color photography, as it has been my privilege to do, without being strongly impressed by one fact: what an observer sees when he looks at a scene can be, and usually is, very different from what he sees when he looks at an accurate color photograph of that scene. The contents of this book are the result of twenty years of continuous investigation into this difference in its various aspects. This has been done both to learn what the differences are and to find out how the photographer may either offset them or make use of them for his particular purposes."

In a number of chapters, including "How We See Things," "How the Camera Sees Things," "Color and Form in Photographs," "The Perception of Light and Color in Photographs," many of the factors which contribute to the visual relationship between the scene and the photograph are described and illustrated. The fact that this relationship is so complex leads to difficulties in defining the "perfect" photographic result. However, a reasonable definition of the "perfect" photographic result is given after first defining the perfect lens image. The availability of a process for giving the "perfect" photographic result is neither a necessary nor a sufficient requirement for the making of excellent quality color photographs. The phenomena which are the subject matter of this book are those which would come into play even with a perfect photographic process.

With it established that photography is not just a means for making a record of the subject matter before the camera, photography can be considered as a creative medium or perhaps even an art medium. To quote the author, "There seem to be two general schools of thought in the matter of beauty in photography: One school, and it is quite widespread, holds, apparently with Ruskin, that all beauty lies in nature. To this school it is the primary aim (and the greatest success of a photographer) to see this beauty and "(capture)" it with his camera. Much of the finest work

which has been done has been produced by men who have followed this philosophy at least verbally.

"The other school admits all but the premise of the belief. They do not believe that all beauty lies in nature. In fact, they believe that their destiny is to *create* beauty out of nature's forms and circumstances.

"It must be apparent to the careful reader that the present writer is forced into the second group by what he feels to be the nature of the photographic process . . ."

The chapters, "Subject and Intention in Photography," "What This Permits Us to Do," "Control in Printing," "Photography as a Creative Medium," deal with the photographer's role in the impressions caused by a picture. The excellent color plates of the beautiful color photographs which are included in the book are good illustrations of the fact that photography is a creative medium and also are excellent illustrations of the dual or rather multiple nature of the impressions obtained from photographs. One gets the impression of excellent *color reproductions* of interesting *color photographs* of *attractive subjects.*

The photographic engineer or serious student of optics may criticize the lack of quantitative treatment of the technical aspects of the photographic process. However, quantitative treatment of these aspects of the subject would be out of keeping with the remainder of the material and with the purpose of the book. For those who wish to become expert serious photographers or for those who wish to understand the tools and procedures of expert photographers this book is a major contribution.

W. T. Hanson, Jr.
Eastman Kodak Company

AARON SISKIND: PHOTOGRAPHS, Horizon Press, New York City, 1959, Introduction by Harold Rosenberg. Designed by Ivan Chermayeff. Fifty Reproductions, $12.50.

The real artist of any medium is the individual with special essential knowledge, a quickened awareness of conscience (whole feeling), and an open mind for sensitive absorption; enough of these attributes working at the same time so that the mind may enter a state of direct knowledge, the ascending scale of inspiration, in focus but not moving, yet actively selective. Once in this compressed state of consciousness, the artist must know what he wants, immediately relevant and responsible to the expansion and enrichment of his experience of nature. Formulation of this inner process by means of concrete imagery creates a new event: an expression of understanding.

Early in the 1950's, Aaron Siskind formulated his aim in these words: "When I make a photograph I want it to be an altogether new object, complete and self-contained, whose basic condition is order – unlike the world of events, actions, change and disorder." When the artist is this aware of his intention he has realized the role of his own work for himself, and enters the difficult and scarcely anticipated obligation to his age: that of releasing and exchanging his accumulated under-

standing through an expression powerful enough to nourish and accelerate the growth of culture in an aesthetic direction. Aaron Siskind has been meeting this obligation through three distinct though closely related roles: photographer, teacher and artist.

Born and educated in New York, Aaron Siskind taught English in the public schools there for more than twenty years. It was not until his thirties, over two decades ago, that he expanded his energies to include the medium of photography against a rich background of poetry and music which had absorbed him almost exclusively until 1935. In his first decade of work he became an accomplished and sensitive photographer within the limits and expectations of the documentary tradition of photography, one of the main-stream expressions of the medium since the invention of the daguerreotype. First alone, and then with several young photographers whom he trained, Siskind produced his most notable work of this period, the widely exhibited series of documentary photographs of the many sided nature of life in New York City.

As a teacher of photography at the Institute of Design, Illinois Institute of Technology, Siskind has functioned as a collaborator and guide to design and photographic projects since 1951. His extensive project at the Institute of Design has been the direction of advanced students towards a selective and definite goal: The photographic study of the architecture of Dankmar Adler and Louis Sullivan. The collective result will be published in book form later this year by Horizon Press.

Since the late 1940's, Siskind's consistent development as an artist has carried him far beyond his initial use of the medium as a photographer. The fine photographer may use the camera to make a sensitive recording of material existence as an event in itself. The developed sensitivity and emotional cognition of the artist will press persistently beyond the sensory authority of "appearances" and will refine the presence of the camera to the function of an absolute collaborator: an intimate witness to the mind of the artist who strives to become an articulate equal to Nature's *unified awareness* in a world of multiplicity. The living role of art expression has always been an inspired anticipation of Nature's modulating order – a mathematics of awareness. The transition from photographer to artist within the context of the camera medium is a strange and difficult transformation. In this intrinsic sense, the finished work of a photographer remains *mathematical in appearance*. The work of an artist is mathematically precise, not in *appearance* but in *operation*.

One of the very few photographers to evolve through the medium and work as a maturing artist, Aaron Siskind emerges from the underground stream of exhibitions, teaching, photographing independently and learning how to collect the truth from his past work, transforming himself with life. He stands amid the few others: there are Cameron, Atget, Stieglitz, Bruguière, Strand, Edward Weston . . . each in his own reality has ventured to affirm that the artist may not only endure but create an individual understanding during those moments of intense absorption intentionally encountered anywhere in the flux of nature. It is of the greatest importance that a book of Aaron Siskind's work is made available at this time, when confusion is most complex as to the role of photography as an art expression. Here is a much needed evidence from the side of quality and psychology in vision with which to release the public mind from the quantities of photographic appearances forcing their measurable weight upon the immeasurable atmosphere of art.

Masterfully designed by Ivan Chermayeff, this volume of fifty brilliant reproductions is one of the most articulate releases of distinctive camera work ever published. The American Institute of Graphic Arts has honored the book in their annual design award as one of the fifty best books of the year. The selection of prints for reproduction was made by Aaron Siskind, who worked the edition through a small printing establishment of his own selection, in order to work personally with the printers. Many of the plates were remade and re-etched until they reproduced to the artist's satisfaction; only four plates were printed to the page-run, to insure the greatest possible control of inking during the production run of 3300 impressions.

The book is invested with a diversity of encountered surfaces ranging through the years 1944 to 1955, from New York and Chicago to Kentucky and New England, Mexico, and many other places. As André Malraux observed in *The Voices of Silence*, the public statuary of the Romans discovered in sunken ships in the Mediterranean, when hauled up to the light of day and photographed, released a mystery of profound aesthetic value due not at all to the unknown sculptor, but to the prodigious ornamentation spun over them by nature at the bottom of the sea. This film of aesthetic material covers the world of abandoned and discarded surfaces. These utterances of nature are Siskind's hieroglyphs, and he often absorbs them with such an intensity of awareness that they confront the mind's eye with the force of an oracle. Just beyond the center of the book one enters into the powerful silence of stones. This series of eight images from the New England coast demonstrate in the most open context Siskind's understanding of *visual reorientation* achieved through selective transformation of the objective *vision* in relation to integral space. Particularly the five experienced at Martha's Vineyard, Massachusetts: these slender and massive incisions in pure space rule this silent world like escaped voices solidified by an unknowable deafness and now released through their being found and seen.

Harold Rosenberg, in the four page introduction, names his speculations on photography "Evidences." The evidence reads for very little more than Mr. Rosenberg's wish to remind himself that the photographs reproduce like paintings ought to reproduce if paintings embodied an image independent of the effect of color and brush texture. As though it is not possible for him to associate in terms of a photograph until he informs himself – well, nevertheless, these images are fine reproductions of abstract expressionist paintings which may not have been painted yet – but just *why* they are not paintings, seems beyond the concern of Mr. Rosenberg's preoccupation with current usage in the medium of painting. However, much of the introduction is relevant description of the fixed-focus vision of the box camera and the commercial snapshots of common-event photojournalism. Since these issues have nothing in common with the positive intentions of the artist, it seems distracting and even misleading to find them placed as an intellectual gateway leading into the wonderful expanse of Aaron Siskind's photography. The exceptional quality of the book is worth far more than its price, and the impressions preserved from Siskind's vision will still be valid when understanding evolves to the degree where the human mind will indeed use this unusual work.

W. C.

THE ODYSSEY OF A FILM-MAKER: Robert Flaherty's Story, by Frances Hubbard Flaherty. Urbana, Illinois, Beta Phi Mu, 1960. $3.00. 45 pages. 18 illustrations.

THE STORY OF THE FOUR "FREE" FILMS made by the "father of documentary," Robert Flaherty (1884-1951), is told here in concise and informal fashion by his wife, Frances.

The four films – "free" in the sense that they reached the public uncompromised, exactly as Flaherty intended them – are *Nanook of the North* (1922), *Moana* (1926), *Man of Aran* (1934) and *Louisiana Story* (1948). Their production carried him to far points of the globe: Hudson Bay, Samoa, the Aran Islands and the Louisiana bayou country, respectively, and cost him infinite patience, but the films remain vital in our heritage, as repeated showings continuously confirm.

Flaherty devoted himself, as his wife puts it, to "thirty years' research of the motion-picture camera." Remembering how, on a porch in Samoa, Flaherty had sat non-plussed as every plan for the story of *Moana* failed before the film was even begun, Mrs. Flaherty is moved to outline the Flaherty method which crystallized then once again, just as it had for *Nanook:* "If you preconceive you are lost, off to a false start before you begin. What you have to do is to let go, let go every thought of your own, wipe your mind clean, fresh, innocent, newborn, sensitive as unexposed film to take up the impressions around you, and let what will come in. This is the pregnant void, the fertile state of no-mind. This is non-preconception, the beginning of discovery."

She makes it clear that Flaherty films should not be confused with the later documentary movement started by John Grierson in England, which, she says, "was from its beginning all preconceived for social and educational purposes" and for timely use. Flaherty films, she writes, "are timeless in the sense that they do not argue, they celebrate." This celebration can operate to rescue and record nearly-forgotten or abandoned techniques of a particular civilization, such as tattooing in Polynesia, and the harpooning of the basking shark off the shores of the Aran Islands.

A helpful chronology at the back indicates how the Flaherty impetus continues in the Robert Flaherty Foundation, holding film seminars every year at Brattleboro, Vermont.

Presented in an attractive gift format, this book is fourth in a series of chapbooks issued by the international library science honorary society, their first devoted to an aspect of photography.

G. P.

QUARTERLY NOTES FROM THE GEORGE EASTMAN HOUSE

THE SEASONS: COLOR PHOTOGRAPHS BY ELIOT PORTER

AN EXHIBITION OF 76 COLOR PHOTOGRAPHS by Eliot Porter was opened on August 12 at an Associates' preview. This outstanding collection interprets, in landscapes and details of the natural scene, the four seasons of the year, and is accompanied

by quotations from Henry David Thoreau. The prints were made by Dr. Porter directly from color transparencies, and show the remarkable potentials of the medium. Dr. Porter, who received the degree of M.D. from the Harvard Medical School in 1929, and subsequently specialized in biochemistry, took up photography as a full time occupation in 1939. Deeply interested in orinthology, he developed a technique for the photography of birds, in their natural surroundings. Approaching the problem with a rare combination of artistic sensitivity, technical skill and scientific knowledge, these photographs have won the admiration of layman and naturalist alike. In addition to this special field Dr. Porter has used his camera to photograph the natural scene, particularly in the Southwest, where he lives, and in New England.

In 1938 Alfred Stieglitz exhibited Dr. Porter's photographs at "An American Place." He is the recipient of two fellowships from the John Simon Guggenheim Memorial Foundation, in 1941 and 1946. His work has been widely exhibited in art museums throughout the country, and has been collected by the Museum of Modern Art and the George Eastman House. The exhibition will remain on display at the George Eastman House through October 1. It will be circulated to other museums by the Smithsonian Institution.

THE PHOTO-SECESSION

AN EXHIBITION OF THE WORK of the Photo-Secession, the society formed by Alfred Stieglitz and Edward Steichen in 1902 for the specific purpose of establishing photography as a fine art, will open on October 15. The exhibition will consist of photographs taken by, or exhibited by, members of the organization. Because the Photo-Secession believed in the importance of showing works of art in other media, the exhibition will also contain some of the original paintings and drawings which were shown by the group in the "Little Galleries of the Photo-Secession" between 1902 and 1917.

PHOTOJOURNALISM SEMINAR OF THE EAST

A FOUR-DAY CONFERENCE on photojournalism will be held at the George Eastman House, from November 2-5, 1960. Co-sponsored by the American Society of Magazine Photographers and Eastman House, the seminar will discuss photojournalism in all its aspects, from the camera to the printed page. Leading photographers, editors and art directors have been invited to lecture and lead discussions.

The Seminar, which will be open to the public, is limited to 150 participants.

IN THE MAGAZINES

A NEW PERIODICAL, *Contemporary Photographer*, makes its bow. A bi-monthly, it is edited and published by Thomas M. Hill, Jr., 33 College Place, Oberlin, Ohio, at a subscription price of $3.00 per year. The first number contains photographs by the editor; an article by Wynn Bullock; a photographic essay "Baton Rouge," by E. A. Woolley; and a portfolio of photographs by Don Keller and John Michael Keller.

The history of photography is featured in three trade magazines: Horst Bradow writes of the development of the Leica camera in *Leica Fotografie* (English edition), No. 2/60 and 3/60; George Berkowitz discusses the origin of the Heidoskop, Rolleiflex and Rolleicord cameras in *Camera News of West Germany,* June, 1960; and the *Minox Memo,* summer, 1960, reprints the article on early subminiature cameras from *Image.*

A portfolio of 20 photographs from the Farm Security Administration files, chosen and commented upon by Roy E. Stryker, appears in the February-March issue of *Harvester World,* house organ of the International Harvester Company. Stryker was chief of the historical section of FSA, and was responsible for the direction of that influential and historic photographic documentation of America during what he calls "the lean thirties."

The place of photography as an academic discipline is surveyed by Van Deren Coke, of the University of Florida, in the Summer, 1960, issue of the *College Art Journal.* After a short historical introduction, Prof. Coke reviews the exhibition "Photographs by Professors," held by the Limelight Gallery, New York City.

STAFF ACTIVITIES

THE DIRECTOR, in collaboration with Mrs. Newhall, conducted a course "Photography for the Historian" at the Seminars in American Culture, sponsored by the New York State Historical Association in Cooperstown, N. Y.

DRYDEN THEATRE TENTH ANNIVERSARY FILM SERIES

MARCH OF 1961 WILL MARK the tenth year of motion picture lecture programs held in the Dryden Theatre. To celebrate the anniversary, a special series of seventeen outstanding motion pictures in the study collection will be presented Monday, Tuesday and Wednesday evenings starting September 27th 1960 and continuing through March 22, 1961.

Films to be shown will include Dovjenko's *Zvenigora,* (Premiere in USA) Bunuel's *Age of Gold,* Jessner's *Erdgeist* with Asta Nielsen and revivals of such timeless classics as *Potemkin, Caligari, The Birth of a Nation* and *The Passion of Jeanne D' Arc.*

TRIBUTE TO POLA NEGRI

IN RECOGNITION OF HER OUTSTANDING ARTISTRY and influence on the course of motion picture history in a notable career extending from 1913 to 1959, the George Eastman House will present a special program as a tribute to Pola Negri November 18 through the 20th.

During these three days and evenings, many excerpts from memorable Negri films will be shown along with several complete versions of her outstanding vehicles including *Forbidden Paradise, Madam Dubarry, Fanatisme,* and *Barbed Wire.* Miss Negri has agreed to attend the first program in person on Friday November 18.